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Both of these papers were followed by an interesting discussion, and the meeting adjourned at 10 o'clock.

C. STUART GAGER,
Secretary.

OF INTEREST TO TEACHERS

NOTES ON EXPERIMENTS IN PLANT RESPIRATION

JANE R. CONDIT

The experiment designed to show that plants give off carbon dioxide rarely gives satisfactory results with the simple apparatus that can be handled by high school pupils. The withdrawal of the air under water is too complicated for pupils of this age. Contrasting results are not always secured by placing small dishes of lime-water under bell jars with and without growing plants because of the proportionately large amount of air from the room enclosed in each.

In the following experiments in plant respiration a simple method of obtaining samples of air for the carbon dioxide test is given; and contrasting results are certain because of the small but equal amount of air in the check bottle.

A small jar was one-fourth filled with damp germinating barley and placed in the dark. When a lighted match was placed in the jar two days later the flame was extinguished at once, showing that the barley had used so much of the oxygen in the jar that there was not enough left to support combustion. A match placed in a similar check jar without the barley continued to burn for some time.

A small wide-mouthed bottle was filled with the gas from the barley jar by first filling it with water and then inverting it in the jar. When fresh lime-water was added to the gaseous contents of the bottle, a heavy white precipitate appeared. A similar check bottle full of ordinary air did not show this precipitate when the lime-water was added. This showed that carbon dioxide must have been given off by the germinating seeds.

The jar was again sealed, placed in the sun light and left for a week. When the leaves had become green the gas in the jar

was then tested with a lighted match. This time the light was not extinguished, showing that the green leaves had given off oxygen.

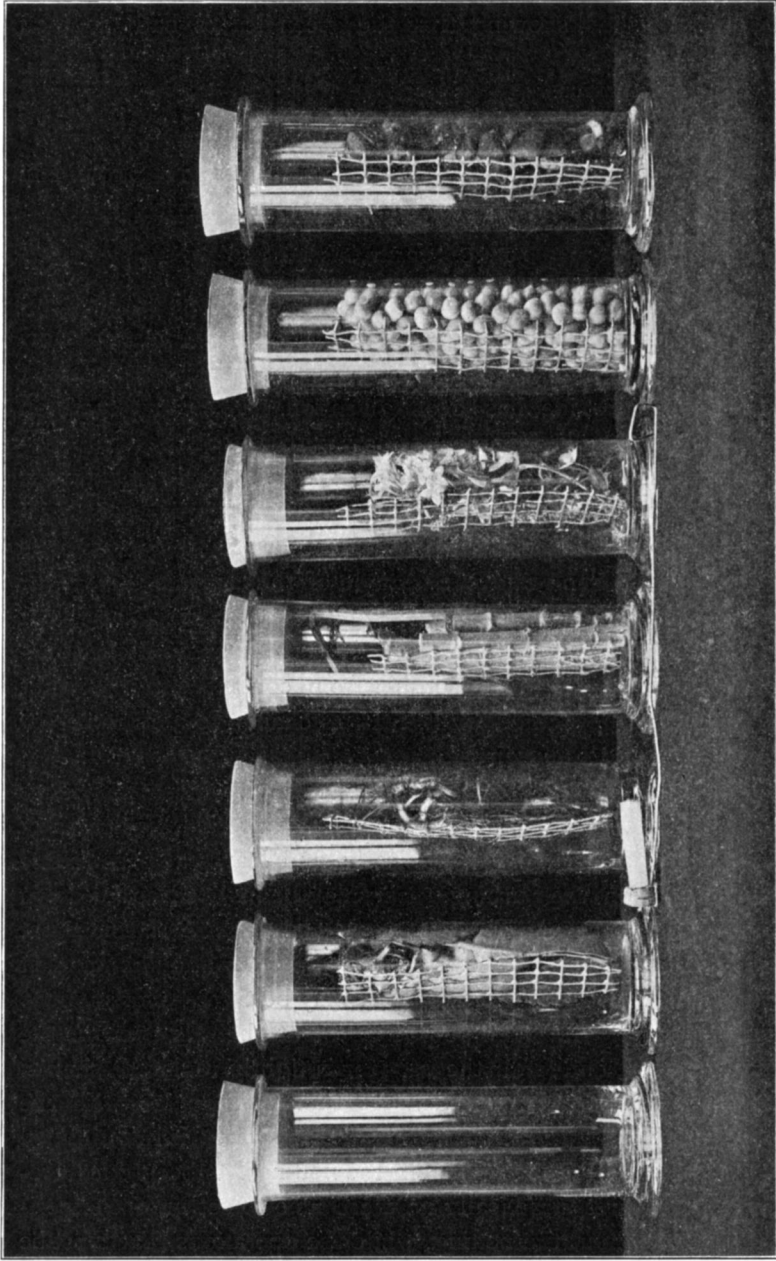
TEACHERS COLLEGE.

A SIMPLE MODIFICATION OF THE EXPERIMENT TO SHOW THE GASEOUS EXCHANGE IN PLANT RESPIRATION

BY C. STUART GAGER

In the experiment to teach the gaseous exchange accompanying the respiration of various plant organs it is essential to show two facts: first, that the oxygen has been absorbed, and, second, that carbon dioxide has been given off. The very common practice of partially filling glass jars with the tissues to be investigated is unsatisfactory in several ways. It is not always easy to lower the lighted taper as far down into the jar as is desirable, and, furthermore, when the lime-water test is applied it is either necessary to remove a sample of the air from the jar, or else pour the lime-water into the jar. The first operation is not easy, and only invites failure. By the second method the lime-water is liable to become so dirty from contact with the plant material, or so obscured by it, that its change to a milky color must be taken largely on faith.

The simple device, shown in the accompanying illustration, does away almost entirely with the above annoyances. A partition of wire netting divides the jar vertically, and leaves a space to one side into which the burning taper may be inserted as far down the jar as necessary. The wire netting should be of somewhat smaller mesh than that shown in the photograph, and should fit snugly into the jar so that the latter may be tipped over slightly. The lime-water may then be poured in at the side opposite the plant-material, and (after the stopper is tightly replaced) shaken well up and down the jar to insure thorough contact with the carbon dioxide. By this means the lime-water is not clouded with dirt from the plants. After the netting has been once prepared it requires practically no more time to set up the experiment than without the netting, while the operations that must be



Apparatus for demonstrating the gaseous exchange in plant-respiration.

performed in the presence of the class are not only smaller in number, but much simpler than when a sample of the air must be removed to be tested.

In the illustration the six jars, besides the empty one, contain, respectively, green leaves, roots, stems, variously colored flowers, germinating seeds, and some kind of fleshy fungus.

NEW YORK BOTANICAL GARDEN.

NEWS ITEMS

Professor H. A. Winkenwerden of the U. S. Bureau of Forestry, is to succeed Professor J. F. Baker as professor of forestry at the Colorado School of Forestry.

Mr. R. H. Biffen, whose researches on the hybridization of wheat and barley have attracted much attention, has been elected to the recently established chair of agricultural botany at Cambridge University.

The Graduate School of Agriculture will hold its third session at Ithaca and Geneva, beginning July 6, 1908, and continuing for a month. The botanical subjects included are Agronomy and Horticulture.

The Marine Biological Laboratory will hold its twenty-first session at Woods Hole, from June 1 to October 1, 1908. The work will include embryology and botany, the latter being under the direction of Dr. George T. Moore.

There is to be held from September 14 to 26 of this year in Olympia Hall, London, England, an International Rubber and Allied Trades Exhibition. Professor Francis E. Lloyd, a member of the Torrey Club, is one of the Mexican Committee, of which Dr. Pehr Olsson-Seffer is Chairman.

The nineteenth annual session of the Biological Laboratory of the Brooklyn Institute of Arts and Sciences will be held at Cold Spring Harbor for six weeks, beginning Wednesday, July 1. The laboratory is also open for investigators during the entire summer. The courses offered include cryptogamic botany, plant ecology, and beginning research in botany.